

## CLAIMS

1. A header, comprising  
a substrate made of an insulative material and having a plurality of through holes formed therein extending between upper and lower sides of the substrate;  
plating applied to the through holes to form conductive cylinders with upper and lower ends;  
and  
a plurality of pre-formed heat re-flowable bonding members attached to corresponding upper and lower ends of the conductive cylinders.

2. The header of Claim 1 wherein the pre-formed heat re-flowable bonding members are solder balls.

3. The header of Claim 1 wherein the pre-formed heat re-flowable bonding members are shaped solder deposits.

4. The header of Claim 1 wherein the substrate has a C-shape including main portion extending in a longitudinal direction and a pair of legs extending in a lateral direction.

5. The header of Claim 4 wherein conductive cylinders extend through both the main portion and the legs of the substrate.

6. The header of Claim 1 wherein the solder balls are made of a 63-37 weight percent alloy of tin and lead.

7. The solder ball header of Claim 1 wherein the substrate is formed of an FR-4 glass filled epoxy.

8. The header of Claim 1 wherein the conductive cylinders are formed with a central axially extending hole.

9. The header of Claim 9 and further comprising a plurality of plugs each filling the central axially extending hole of a corresponding conductive cylinder.

10. The header of Claim 1 and further comprising at least one locator pin having a first end secured in the substrate and a second end extending from the substrate for registration with a locator hole in a circuit board.

11. A circuit board assembly, comprising:  
an upper circuit board including a plurality of conductive elements formed on a surface thereof;

a lower circuit board including a plurality of conductive elements formed on a surface thereof;

a header including a substrate made of an insulative material and having a plurality of through holes formed therein extending between an upper side of the substrate and a lower side of the substrate, and plating applied to the through holes to form conductive cylinders with upper and lower ends; and

a plurality of pre-formed heat re-flowable bonding members attached to corresponding upper and lower ends of the conductive cylinders and corresponding conductive elements of the upper and lower circuit boards to mechanically and electrically connect the upper lower circuit boards in spaced apart, substantially parallel relationship.

12. The assembly of Claim 11 wherein the header has a generally C-shaped configuration.

13. The assembly of Claim 11 wherein the conductive cylinders each have a hole formed there through.

14. The assembly of Claim 11 wherein the conductive cylinders are solid throughout their length.

15. The assembly of Claim 11 wherein each pre-formed heat re-flowable bonding member comprises a solder ball.

16. The assembly of Claim 16 wherein each solder ball wraps around a side wall of a corresponding conductive element and a side wall of an end of a corresponding conductive cylinder.

17. The assembly of Claim 11 wherein the conductive cylinders have holes therethrough which are plugged by a pin.

18. The assembly of Claim 11 wherein the conductive cylinders have holes therethrough which are plugged with a conductive epoxy.

19. The assembly of Claim 11 wherein the conductive cylinders each have upper and lower disc-shaped end portions.

20. A circuit board assembly, comprising;  
upper and lower generally planar circuit boards each formed with an array of conductive elements, the circuit boards being mechanically and electrically interconnected in a substantially spaced apart, parallel relationship by at least one solder ball header, the solder ball header including an elongate substrate made of an insulative material having a plurality of spaced apart through holes, each of the through holes having a conductive cylinder extending therethrough, each of the conductive cylinders having upper and lower disc-shaped end portions, and a plurality of solder balls each bonded to a corresponding opposing conductive cylinder end portion and conductive element, the solder balls wrapping around vertical side walls of the conductive cylinder end portions and conductive elements.